



Cal/EPA

June 17, 1997

Department of
Toxic Substances
Control

700 Heinz Avenue
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Commander
Department of the Navy
Engineering Field Activity, West
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Attn: Mr. Stephen Chao, Project Manager
900 Commodore Drive, Bldg. 210
San Bruno, California 94066-2402

Pete Wilson
Governor

James M. Strock
Secretary for
Environmental
Protection

Dear Mr. Chao:

**DRAFT FINAL STATION-WIDE FEASIBILITY STUDY REPORT
(SWFS), MOFFETT FEDERAL AIRFIELD**

Enclosed please find the California Department of Fish and Game's comments on the subject document. Please incorporate all the comments in the revised draft final SWFS. If you have any questions regarding these comments, please call me at 510-540-3830 or Ms. Patricia Velez at 408-649-2876.

Sincerely,

C. Joseph Chou
Remedial Project Manager
Base Closure Unit
Office of Military Facilities

Enclosures

cc: Mr. Michael Rochette
Regional Water Quality Control Board
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Mr. Michael D. Gill
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75 Hawthorne St.
San Francisco, California 94105

Ms. Patricia Velez
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Memorandum

: Mr. Joseph Chou
California Environmental Protection Agency
Department of Toxic Substances Control
700 Heinz Avenue, Building F, Suite 200
Berkeley, California 94710

Date : June 6, 1997

From : Department of Fish and Game

Subject : **Review of the Moffett Federal Airfield Draft Final Station-Wide Feasibility Study Report (dated November 8, 1996) (5920/60120/NTX 405 00:80)**

This memorandum is in response to your resource request dated November 19, 1996, requesting review of the subject document. This Moffett Federal Airfield (MFA) Draft Final Station-Wide Feasibility Study (FS) Report attempts to identify and evaluate a range of remedial alternatives to cleanup environmental contamination at sites that have not been previously addressed. This FS report is partially based on information contained in the draft final Phase II site-wide ecological assessment (SWEA) report, which has yet to be finalized. Once the SWEA has been revised, with all the outstanding issues addressed, the Department of Fish and Game expects the FS will be revised accordingly. As a State of California natural resource trustee agency, the Department of Fish and Game (DFG) recommends that the following specific comments and concerns be addressed to ensure that State trust natural resources, including fish, wildlife species, biota, and their habitats, are protected.

Specific Comments

1. Executive Summary (page ES-2)

Several issues that "remain unclear" in the SWEA are listed. Please specify whether these are all the outstanding issues that remain to be resolved. Pertaining to the SWEA, DFG has concerns, which are discussed below, with the following outstanding issues pertaining to the use of the high toxicity reference values (TRVs) and the use of Hazard Quotients (HQs).

The report utilizes two toxicological "benchmarks", referred to as Hazard Quotients which are used to assess potential adverse effects to ecological receptors, including State fish, wildlife, biota, and their habitats. HQ₁ and HQ₂ or the ratio of a particular exposure route dosage (or media concentration) to a reference dose (or media concentration), utilized high Toxicity Reference Values (= less sensitive receptor responses), whilst HQ₃ and HQ₄ were derived from "low" TRVs or values developed from longer term exposures or more sensitive toxic endpoints, such as reproduction.

These HQ's need to be evaluated in the context of their use in determining the ecological risks of hazardous chemical releases and the subsequent selection of a remedial action or risk management decision. The principal result of a "remedy" or "remedial action" is to "...prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger...to the

environment”¹ and “protect and restore (natural) trust resources”². This latter overarching and equally important aim of the hazardous waste cleanup or remediation becomes the minimum standard or remediation goal to be attained in the select of a remedial action. With that guidance and as the principal State trustee for fish, wildlife, biota, and their habitats, DFG can only recommend remedial actions which restore trustee resources to “baseline” or “conditions that would have been expected at the assessment area had the discharge or release of the hazardous material not occurred (underline added)³. Consequently, this guidance (Comprehensive Environmental Response, Compensation and Liability Act, CERCLA, law and regulations) clearly does not allow cleanup goals that would allow continued toxicity to natural resource populations, for example. The HQ’s which are derived from the “low” TRV’s must be used to establish risk or the likelihood of adverse effects from contaminants to trust natural resources. These HQ’s should protect the most sensitive species, as they use lowest no observable adverse effect levels or NOEALs. If one did not employ these lower values to estimate risks and drive the remediation, it is intuitively obvious that full protection of fish, wildlife, biota, and their receptors can not be achieved. Any resultant remedial action, based upon the high TRV will, more likely than not, cause continued injuries to State trust resources. Further restoration actions are warranted by the Federal and State natural resource trustees if HQ1 and HQ2 criteria are employed in the remedial investigation. If the HQ3/4 estimates exceed one, more evaluation is need to define, characterize, and evaluate natural resource endpoints responses or injuries (*sensu* CERCLA § 107, injuries to natural resources) to allow the State and federal natural resource trustees to determine the need for further actions, for example restoration.

2. Section 1.2.4 Contamination Entering from Off Site (page 12)

Please specify on whether the Middlefield, Ellis, and Whisman (MEW) Superfund site is the sole source of VOC contamination at MFA.

3. Section 1.3.2 Site-Wide Ecological Assessment (pages 16-17)

Please elaborate further on the Phase I SWEA methodology and site characterization described in this section.

It is stated that wetland areas were identified based on criteria from the U. S. Fish and Wildlife Service (USFWS) and the U. S. Army Corps of Engineers (COE). Please specify whether all the wetland areas were identified utilizing both criteria, how the USFWS and COE criteria differ, and why the wetland areas were not identified based on DFG criteria.

4. Section 1.3.2.1 Phase II SWEA Overview (pages 17-23)

Refer to DFG comment number one above pertaining to HQs, HIs, and TRVs.

¹ CERCLA § 101 (24); 40 CFR Ch.1, Part 300, Subpart A, § 300.5

² CERCLA § 122(j)(2); quote from US EPA, 1992. The role of natural resource trustees in the Superfund process. ECO Update, OSWER Publ. 9345.0-051. p.8.

³ 43 CFR Subtitle A, §11.72 (b)(1).

What will be done or is being done to eliminate and/or address all the listed major sources of uncertainties associated with the risk assessment for benthic, avian, and mammalian receptors.

5. Section 1.3.2.2 Summary of Ecological Risk (page 23)

What is meant by moderate in the statement "...results in a moderate possibility of adverse effects on receptors?"

6. Section 1.3.3.2 Wetland Areas (page 30)

This section seems to focus on the role of wetlands as "waste treatment systems" and "limited sinks." It is necessary to take into account that some of the wetlands at MFA are closed systems, not open systems with flushing action, which tend to accumulate the contaminants removed from the waste water, thus making them accessible to the food web (i.e., aiding in the biotransfer of contaminants to higher trophic level organisms). Wetlands can "limit the bioavailability of a number of constituents," but they do not stop all the constituents from being bioavailable.

Pertaining to the statement that "...sediment bioassays showed limited toxicity for some organisms, the potential impact to populations in these marshes is not clear." When and what is being done to make this clear.

There is existing contamination in the wetlands and the remediation of at least the identified hot spots should be taken into consideration in this section.

7. Section 1.4.2 Identification of Potential ARARs (page 34)

DFG submitted a list of potential ARARs and TBCs to Ms. Susan Mearns of Montgomery Watson on March 29, 1994 and to the Department of Toxic Substances and Control (DTSC) on September 30, 1996. DFG requests that all potential ARARs and TBCs submitted by DFG be addressed, either in the text of these sections or in Appendix A.

Please provide the rationale for determining that DFG's potential ARARs are not applicable or relevant and appropriate. Also, please also provide the rationale for considering and rejecting DFG's TBCs. Finally, please explain how those ARARs identified in Appendix A are more stringent than DFG's potential ARARs/TBCs and how they will ensure protectiveness of fish, wildlife, biota, and their habitat.

8. Section 1.4.2.2 Potential Federal and State Location-Specific ARARs (page 36)

Pertaining to the statement "The State of California has adopted the U. S. Fish and Wildlife Service definition for wetland areas and does not have more stringent laws and regulations for protection of wetland and flood plain areas than the federal laws and regulations." The DFG has adopted the USFWS wetland definition (as contained in Cowardin et al., 1979) for Department use in conjunction with application of DFG's Wetland Resources Policy. Please clarify if this is the USFWS criteria that the wetlands were identified on as stated on page 17.

It is stated that "under the federal program, if wetland destruction or loss is necessary, then new, comparable wetlands areas may need to be established so that there is no net loss of wetlands." The DFG wetland policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. For every acre of wetland lost, no less than an acre of wetland must be created from non-wetland habitat. Compensation for the loss of wetland habitat values to fish and wildlife resources requires the creation of habitat values at the compensation site which at least duplicate those habitat values which are lost to project implementation.

Mitigation for habitat values lost to the implementation of a project may be accomplished in four ways taking into consideration mitigation site location and wetland type to be created or enhanced: In-kind, on-site; In-kind, off-site; Out-of-kind, on-site; and Out-of-kind, off-site. Please refer to the enclosed document "Department of Fish and Game Recommended Wetland Definition, Mitigation Strategies, and Habitat Value Assessment Methodology" for further information.

Please elaborate on how long it will take for the "capping or excavation of contaminated soil and sediment" to be complete and describe what actions will be taken to compensate for the interim-loss of wetlands and adverse impacts to fish and wildlife during these remediation activities. Please also elaborate upon how the impacted wetlands would be "re-established" the factual basis for determining that no wetlands will be "lost". Please also explain what contingencies are planned for in the event wetlands are not re-established or are lost during the remediation.

9. Section 2.1.1.1 Chemicals of Concern (page 42)

The DFG does not agree with the elimination of metals from consideration for the purposes of identifying remediation areas. The Phase II SWEA identifies metal concentrations in the sediment that occur at levels above the background levels. These present high levels may pose potential ecological risks to the wildlife present.

10. Section 3.1.4 Removal (page 55)

Cost alone does not provide sufficient justification to warrant the removal of only the first 1 foot of soil when as stated, "pathways to human and ecological receptors are though direct contact with the top 2 feet of soil and sediment."

11. Section 3.2.4 Containment (page 65)

Please elaborate on the wetland "restoration" that would be involved and specify on how the wetlands from the Eastern Diked Marsh and the stormwater retention pond would be "relocated." Since it would depend on the capping material utilized on whether "the ecosystem may reestablish itself," DFG would not support the use of capping material that would not allow this to occur.

12. Section 4.1 Sediments (page 76)

The listed issues regarding the SWEA that still remain unclear all involve CERCLA requirements (see DFG comment number one). Also, refer to DFG comment number one in regards to the

unacceptable use of HQ₁ for any of the remedial options proposed, the use of HQ₁ would not provide adequate protection to the natural resources and their habitats.

The statement "...destroying active and thriving wetlands and ecological habitats for uncertain benefits" (which is made several times throughout the document), concludes that remedial action will cause injuries to wetlands without providing any analysis, data, or evaluation. DFG believes that remediation of hazardous waste in wetlands is feasible, is cost effective, and can be accomplished without destroying the wetland for "uncertain benefits." Reference to "active and thriving wetlands" is difficult to evaluate in the context of exposure to hazardous wastes, and resultant toxicological impacts. With respect to regulatory guidance the SWEA has not evaluated, considered, nor analyzed data and studies to determine the "baseline" condition of State fish, wildlife, biota, and their habitats. As a consequence the State Natural Resource Trustee Agency can not concur with the conclusion that the remediation (or lack thereof) complies with the intent of CERCLA to return natural resources to conditions which prevailed (or would have prevailed) had the release of hazardous substances not occurred.

As part of the remedial action, there should be an analysis and evaluation of how Navy intends to compensate the state for the injuries to its natural resources and related services lost to the public that occur during remediation and post-remediation. While DFG's preference is for full restoration, i.e., a return to conditions that would have existed had the release(s) not occurred, DFG also recognizes that rehabilitation, replacement, and/or acquisition of equivalent resources may be viable alternatives under certain circumstances.

13. Section 5.1.3 Removal and Off-Site Disposal (pages 90-91)

It is stated that "the ecological exposure pathway is contained within the top 1 foot of sediment," yet on page 55 is stated that "pathways to human and ecological receptors are through direct contact with the top 2 feet of soil and sediment." These are contradictory statements, please clarify.

Elaborate on what is meant by "minimal verification" sampling will be necessary. And what is meant by "low" in the statement, "The remaining risks associated with residual COCs left in place (at depths greater than 1 foot) are low..."

14. Section 6.1.2 Balancing Criteria (page 102-104)

DFG disagrees with the statement that Alternative 2 (institutional controls through fencing, signs, and ecological monitoring) may meet the threshold criteria of overall protection of human health and the environment. DFG believes long-term ecological monitoring is not protective of fish, wildlife, biota, and their habitat and would fail to meet DFG's stated ARARs if subsequent monitoring determined that adverse impacts to ecological receptors have occurred or continue to occur.

Moreover, DFG believes Alternative 2 does not meet the strong statutory preference for remedies that provide long-term effectiveness and permanence or that reduce toxicity, volume or mobility of contaminants that would be met by selection of Alternatives 3-7.

The statement is made "Alternative 7 offers the most long-term effectiveness and permanence" and in the preceding paragraph it is stated that "Alternatives 2 through 7 all provide the same level of permanence." These are contradictory statements, please clarify. What is the time frame being discussed when referencing "long term" monitoring, effectiveness, and permanence.

Pertaining to the statement, "The restoration of these areas to the baseline condition will require significant effort." Does "baseline condition" mean prior to any contaminants having been released and what is meant by "significant"?

15. Appendix A (page A-2)

First and foremost, please respond to DFG comment number seven.

In the analysis of the "Executive Order 11990 Wetlands Protection" the report implies that habitat destruction is unavoidable and damage to wetland areas including benthic communities and, presumably other natural resources by the implementation of remedial action of capping and/or excavation. DFG believes that there are engineering and ecological techniques available to mitigate/minimize impacts from those remedial treatments. Although the ARAR analysis does not further identify how the alternatives will comply with this executive order DFG believes none of the described alternatives are precluded because of this ARAR.

Table A-1 also states "overtime habitat should re-establish naturally." DFG would like to have clarification of this statement. DFG strongly believes that active re-vegetation and other mitigation measures should occur to restore the wetland to baseline conditions as soon as possible. The Department of the Navy (DON) should not solely rely upon natural restoration.

16. Appendix C (pages C-1, C-5)

This appendix presents options for the "long-term monitoring at MFA to track the progress of the ecosystem toward recovery." Is the time frame being placed on "long-term monitoring" 5 years? In a five year period there will be a total of three biological surveys conducted (one immediately following the remediation action, another one 2 years after and the final one 5 years following the remedial action). Monitoring should occur on a frequent basis (i.e., no less than every 5 years), it should commensurate with the types of vegetation and the sedimentation recovery rates, and it should be conducted for the life of the contaminant(s) left in place. Given the potential adverse impacts that may result from the proposed remediation activities, DFG believes that DON may need to monitor beyond 5 years in order to ensure that full restoration has occurred.

In which instances are the soils of concern not adjacent to the runways or near operational activities?

Please specify which bivalve larvae is being contemplated for use as a test organism for the long-term monitoring plan.

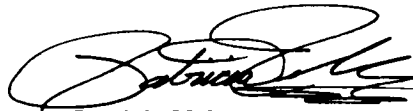
Pertaining to the establishment of a reference site to use for MFA, DFG would like to have this issue investigated further. DFG is not certain that the proposed San Francisco Bay site that is

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currently being used for Hunter's Point, may be the best site for MFA, this warrants further discussion.

Since the biological surveys will not be a detailed cataloging of the entire biological community, which specific species will the survey focus on to ensure that species that may be impacted are not overlooked. Will the sediment biological survey focus on the whole benthic population present or just select organisms? Will a census on all birds present be conducted or just on specific key species? How will the "health of the special status species" be monitored?

Thank you for the opportunity to comment upon the subject document. Staff from the DFG's Military Facilities Team should be included in any further discussions and document review pertaining to this Station-Wide Feasibility Study Report for Moffett Federal Airfield. If you have any questions regarding this memorandum, please contact Ms. Patricia Velez, Senior Biologist, Military Facilities Team, California Department of Fish and Game, 20 Lower Ragsdale Drive, Suite 100, Monterey, California, 93940 or by telephone at (408) 649-2876.



Patricia Velez
Senior Biologist
Moffett Federal Airfield, Program Manager

Enclosure

cc: California Department of Fish and Game

Mr. Don Lollock
Sacramento

Mr. Jonathan Clark
Sacramento

DEPARTMENT OF FISH AND GAME
RECOMMENDED WETLAND DEFINITION,
MITIGATION STRATEGIES, AND HABITAT VALUE
ASSESSMENT METHODOLOGY

DEPARTMENT OF FISH AND GAME

Prepared by
Environmental Services Division

Presented by Glenn Rollins, Environmental Services Supervisor in
public workshop to the Fish and Game Commission, on June 24, 1987,
Sacramento

INTRODUCTION

At the March 9, 1987 Fish and Game Commission hearing during which the Commission adopted a wetlands policy, the Commission assigned the Department two tasks. These tasks were: 1) to recommend a wetland definition for use in the implementation of the Commission's adopted policy, and 2) to recommend a means by which retention of wetland habitat values may be assured when it becomes necessary to compensate for the loss of wetland acreage and/or wetland habitat values resulting from the implementation of projects or other activities. This report is intended to respond to the Commission's request.

The Commission's wetland policy is not a regulatory program. The Department and the Commission possess only limited regulatory authority over potential uses within remaining wetlands not currently owned by the Department. Our role in wetland protection, as we have explained in our March 9, 1987 report to the Commission, is primarily advisory in nature. Therefore, this report identifies a wetland definition and an implementable procedure by which wetland acreage and habitat values will be retained when it has been determined that projects, plans or other activities will occupy or otherwise adversely impact wetlands.

WETLAND DEFINITION

It is apparent that the adequacy of the Commission's wetland policy is directly related to the adequacy of the wetland definition to which the policy relates. As we indicated in our previous report to the Commission, the Department has found the U.S. Fish and Wildlife Service (USFWS) wetland definition and classification system to be the most biologically valid of those definitions and classification systems presently utilized in California.

The USFWS definition utilizes hydric soils^{1/}, saturation or inundation, and vegetative criteria, and requires the presence of at least one of these criteria (rather than all three) in order to classify an area as a wetland. The USFWS definition has been employed in project review nationwide for over 8 years.

It has been well tested and proven to be adequate. Further, because it requires the application of the same array of biological and physical parameters, it exhibits a degree of consistency and uniformity which is advantageous to biological and developmental planners alike. The Department's use of the USFWS wetland definition as the principal means of wetland identification, combined with on-site inspections to establish actual wetland acreage and habitat values, will substantially

^{1/}Hydric soils are those soils identified as such by the U. S. Soil Conservation Service criteria.

increase the consistency of our wetland determinations. This improved level of consistency should subsequently alleviate the past uncertainties and frustrations experienced by the development community. Lastly, and as will be explained in greater detail later, if a wetland compensation site is to be located within or adjacent to the project site, assurances regarding the establishment and long-term retention of fish and wildlife habitat values must be provided.

The USFWS definition is as follows:

"Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes^{2/}; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year." (Classification of Wetlands and Deepwater Habitats of the United States"; FWS/OBS 79/31; December 1979).

^{2/} Pursuant to the USFWS document "List of Plant Species that Occur in Wetlands - Region O" - Region O is California.

The USFWS wetland classification publication also describes the upper (landward) and lower (waterward) limits of wetlands. These limits are described as follows:

"The upland limit of wetland is designated as (1) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover; (2) the boundary between soil that is predominantly hydric and soil that is predominantly non-hydric; or (3) in the case of wetlands without vegetation or soil, the boundary between land that is flooded or saturated at some time each year and land that is not." (Ibid, page 4).

The lower limit of wetlands in estuarine or marine areas (i.e., those wetlands which are subject to the ebb and flow of the tide) is established as coincident with the extreme low spring tide. The lower limit of wetlands in an inland setting (i.e., those wetlands associated with lakes, rivers, ponds, vernal pools, etc.) is established at a depth of two meters (6.6 feet) below low water; however, if emergents, shrubs, or trees grow beyond this depth at any time, then the deepwater edge of such vegetation is the boundary.

The USFWS definition includes, swamps; freshwater, brackish water, and saltwater marshes; bogs; vernal pools; periodically inundated saltflats; intertidal mudflats; wet meadows; wet pastures; springs and seeps; portions of lakes, ponds, rivers and streams; and all other areas which are periodically or permanently covered by

shallow water, or dominated by hydrophytic vegetation, or in which the soils are predominantly hydric in nature.

Therefore, for all of the reasons set forth above, the Department recommends the USFWS definition as its principal means of wetland identification in conjunction with on-site inspections for implementation of the Fish and Game Commission's policy.

RETENTION OF WETLAND ACREAGE AND HABITAT VALUES

The Commission's wetland policy contains essentially two considerations for offsetting adverse impacts to wetland resources. The policy stresses the need to compensate for the loss of wetland habitat on an acre-for-acre basis. That is, for every acre of wetland lost, no less than an acre of wetland must be created from non-wetland habitat. Compensation for the loss of wetland habitat values to fish and wildlife resources requires the creation of habitat values at the the compensation site which at least duplicate those habitat values which are lost to project implementation. Requisite assurance that habitat values will, in fact, be at least retained shall be the subject of the remainder of this discussion.

Mitigation for habitat values lost to the implementation of a project may be accomplished in four ways taking into consideration mitigation site location and wetland type to be created. The term "out-of-kind" as used in mitigation scenarios 3 and 4 refers to different types of wetlands and does not include the replacement

of wetland habitat with nonwetland habitat. These mitigation alternatives, in descending order of general acceptability are:

1. "In-kind, On-site". This form of mitigation would seek to duplicate the physical nature of the wetland area to be negatively impacted within or adjacent to a project site. This mitigation technique, if properly applied, would tend to assure that the habitat derived from wetland creation is essentially identical to that which was lost to development; would concentrate on benefiting those fish and wildlife species and local populations adversely impacted by development; and would tend to provide a greater degree of certainty that the benefits provided by the impacted wetland to associated plant and animal communities in the project vicinity are retained.
2. "In-kind, Off-site". This form of mitigation would be selected when "in-kind, on-site" mitigation would result in the creation of wetlands of demonstrably inferior quality to those which could be created elsewhere. In general, "in-kind, off-site" mitigation should be located as near to the impact site as is feasible. The advantage of in-kind, off site mitigation is that it would, through duplication of the physical nature of the wetland area to be negatively impacted, tend to benefit those fish and wildlife species which would be adversely impacted at the project site and would also tend to maintain their population levels. This form of mitigation

does not necessarily assure retention of the local fish and wildlife populations affected by the project.

3. "Out-of-kind, On-site". It is conceivable that situations could exist where fish and wildlife resources would be better served from a regional standpoint if creation of wetlands of a different type than those adversely impacted through development were selected as mitigation. For example, it could be that, from a management perspective, a freshwater marsh is more valuable to fish and wildlife resources in a given region than an equivalent area of saltmarsh. In such a situation, the Department believes that an alternative to mandatory in-kind replacement of habitat values can be desirable. However, out-of-kind mitigation is generally inferior to in-kind mitigation, since it does little to provide assured benefit to those species which would be negatively impacted as a result of development. Therefore, only if a compelling biologically-based rationale exists for acceptance of out-of-kind mitigation should such a form of mitigation be employed. Application of out-of-kind compensation on site would generally provide values which relate geographically to those values lost through development, and would generally result in benefiting that ecosystem, or collection of communities, with which the developed wetland was associated.
4. "Out-of-kind, Off-site" - This form of mitigation would not result in the maintenance of those fish and wildlife values

lost through development nor would it necessarily have any bearing upon the ecosystem involved at the project site. For these reasons, "out-of-kind, off-site mitigation" is a less acceptable means of compensating for adverse impacts to wetlands. However, if mitigation approaches 1, 2, and 3 cannot be employed, and if the choice is retention of wetland acreage through out-of-kind, off-site compensation or a net loss of wetland acreage, then, and only then, would the Department accept out-of-kind, off-site compensation.

For the reasons explained above, the Department will normally seek to compensate for adverse impacts to wetland through in-kind compensation. The controlling assumptions involved in this mitigation approach are: (1) Given duplication of the physical features associated with wetlands to be impacted, the vegetative component of the wetland to be impacted can also be duplicated either through a planting program or through natural colonization and (2) If the physical features and the vegetational components of the impacted area are duplicated, then fish and wildlife resources should become established at the mitigation site at levels which compensate for losses sustained at the project site. Physical features include substrate contours, water depth, duration of inundation, periodicity of inundations, salinity, and soil type.

When dealing with in-kind compensation, it is essential to consider each of the representative species or species groups present at a project site and to assure that those representative

species or species groups will not be negatively affected. This can be accomplished by taking into consideration existing values provided at the project site and comparing those to the values which would be provided at the compensation site. A habitat evaluation procedure, such as that used by the USFWS, could be used to assure no reduction in habitat value for any of the representative species or species groups present at the project site, provided that such a procedure presumes that there shall be no net loss of wetland acreage. When dealing with out-of-kind compensation, it is neither desirable nor reasonable to attempt to show equivalency between values foregone at the project site and those different values to be generated at the compensation site. As we have previously indicated, the rationale for acceptance of out-of-kind compensation shall be based upon a biological determination that, from a regional perspective, out-of-kind compensation is demonstrably superior to in-kind compensation.

Buffers between existing or proposed development and existing wetlands or wetland compensation sites should be included as an integral component of all mitigation plans in order to assure the attainment and maintenance of habitat values sufficient to compensate for project impacts. Buffers should be of sufficient width and should be designed to eliminate potential disturbance of fish and wildlife resources from noise, human activity, feral animal intrusion, and any other potential sources of disturbance. The size and character of buffers shall ultimately be determined by the requirements of the affected species most sensitive to such disturbances. When feasible, buffers should be designed in a

manner which compliments the habitat values associated with adjacent wetland. For example, a buffer located near freshwater ponds could be planted with those grasses and forbes known to support high density nesting by waterfowl. In no case shall such buffers be credited as wetland acreage necessary to achieve compliance with the requirements of the Commission's policy regarding retention of wetland acreage.

The loss of wetland acreage and habitat values to project implementation is permanent. Therefore, it is necessary to maintain the mitigation area in perpetuity in order to compensate for the permanent effects of development. It follows then that the project sponsor and his successor(s) must be responsible for the acquisition, development, and permanent maintenance of the compensation site in a manner which fully mitigates the projects impacts to fish and wildlife resources. For this reason, the Department recommends that permanent maintenance of compensation sites be required as a condition of the granting of any permits which might be required for project construction.

As was pointed out by several public speakers at the Commission's March 9, 1987 hearing, the art of wetland creation and enhancement is not yet a science. The Department is confident that wetlands can be created in such a manner as to duplicate or exceed that acreage and those habitat values associated with wetland areas which may, in the future, be developed. However, we are also aware of the possibility that wetland creation sites may not develop all of those fish and wildlife values which were projected

at their inception. Therefore, the Department recommends the universal application of requirements that fish and wildlife values at compensation sites shall be thoroughly assessed after their construction pursuant to appropriate permit conditions; that these values be compared to the values which were lost through project development; and that the project sponsor or his successor(s) be required to take such actions as may be necessary to offset any habitat value shortfall which may be discovered as a result of followup studies.

The foregoing discussion relates primarily to individual project review, and provides a framework for assuring retention of wetland habitat values lost through project implementation. However, a related, but somewhat less obvious, problem threatens the preservation of wetland habitat values on a statewide basis. This problem involves the direct impacts of large-scale urban expansion upon upland plant communities, and the indirect impacts of such upland development upon wetland habitat values. The problem revolves around the fact that wetlands generally exist as biologically valuable components of larger aggregations of biological communities including a variety of upland communities. Wetlands and associated uplands complement one another. Numerous animals found in wetland areas are, nevertheless, at least partially dependent upon associated uplands. For example, waterfowl, which rest and forage in wetlands, are also, at times, dependent upon associated upland areas for nesting. If, in this example, we protected the wetland but lost the associated upland to development, then the wetland would provide reduced habitat

values for waterfowl. So it is with many animals. In spite of the fact that elimination of the ecological bond between wetlands and associated uplands often reduces the value of wetlands to fish and wildlife resources, relatively little regulatory authority exists for dealing with this issue on a project review, or permit review, basis. It seems that the most effective means of addressing this ongoing problem is to place increased emphasis upon the future review of county general plans in an attempt to steer unavoidable future urban expansion into patterns which provide for retention of upland/wetland relationships. Failure to retain this ecological bond between wetland and associated uplands will result in the creation of isolated wetland enclaves scattered throughout highly urbanized areas, and will result in indirect loss of wetland habitat values. The Commission should be aware that no universal regulatory framework exists for effectively dealing with this issue. Nevertheless, the Department shall attempt to address this issue through county general plan review and the review of other long-range planning documents and actions by local, state, and federal agencies.

The Department believes that a concerted effort to protect California's remaining wetlands can result in achieving compliance with the Commission's wetland policy. In order to retain and to expand California's wetland acreage and wetland habitat values, it will be necessary, in light of the non-regulatory nature of the Commission's policy, to work closely with the development community and various local, state, and federal governmental entities. Given a mutual commitment on the part of all concerned

parties, maintenance of wetland acreage and attendant fish and wildlife values is possible. Through a combination of such cooperation and a continuation of ongoing wetland acquisition, enhancement, and creation activities by local, state, and federal agencies as well as similar efforts by various sportsmen's groups and other conservation organizations, the Department is optimistic that expansion of California's wetland acreage and considerable increases in attendant wetland habitat values are both achievable.

The Department wishes to thank the Commission for the opportunity to recommend a comprehensive wetland definition and identification process, and to recommend the means by which the Commission's wetland policy may be implemented.